

CLAIMS

What is claimed is:

1. A method of providing an interactive voice response system, comprising:
recognizing a spoken question using a grammar that is automatically updated from sources of information external to the interactive voice response system.
2. A method as recited in claim 1, further comprising automatically obtaining at least one set of topics for questions spoken by a user from the sources of information.
3. A method as recited in claim 2, wherein said obtaining uses at least one communication connection between the interactive voice response system and at least one news report provider to obtain news reports.
4. A method as recited in claim 3, wherein said obtaining includes repeatedly accessing the at least one news report provider via a computer network.
5. A method as recited in claim 4, further comprising:
extracting keywords from the news reports; and
updating the grammar using the keywords.
6. A method as recited in claim 5, further comprising:
storing at least part of the news reports; and
outputting at least one of the news reports when the spoken question contains at least one of the keywords extracted therefrom.
7. A method as recited in claim 6, further comprising identifying the keywords from information included in the news reports.

8. A method as recited in claim 6, further comprising comparing words in the news reports with a list of potential keywords to identify the keywords for said extracting.

9. A method as recited in claim 6,
wherein said storing stores at least one file containing an audio signal related to at least one of the news reports; and
wherein said outputting plays back the at least one audio file.

10. A method as recited in claim 6, wherein said extracting is performed on text data associated with the audio signal.

11. A method as recited in claim 6,
wherein said storing stores at least one text file related to at least one of the news reports; and
wherein said outputting includes text-to-speech conversion of the at least one text file.

12. A method as recited in claim 3, further comprising determining the at least one news report provider based on selection by the user.

13. A method as recited in claim 12, wherein said determining is performed by
outputting an audio signal containing a list of available news report providers; and
receiving selection of the at least one news report providers by the user.

14. A method as recited in claim 12, wherein said determining is performed via a computer network connection between the interactive voice response system and a computer operated by the user.

15. A method as recited in claim 1, further comprising automatically obtaining grammar words to be added to the grammar from at least one message for a user.

16. A method as recited in claim 15, further comprising:

comparing message words in the at least one message with information in a global information database to determine for each message word whether there are any corresponding questions that can be answered by information in the global information database; and

updating the grammar with the corresponding questions and related message words.

17. A method as recited in claim 15, further comprising:

comparing message words in the at least one message with information in a synonym database to determine synonyms for the message words; and
adding the synonyms to the grammar.

18. A method as recited in claim 15, further comprising automatically adding words to the grammar based on a source of the message.

19. A method as recited in claim 18, wherein the message is a voicemail message and the source of the message is determined based on automatic number identification provided when the voicemail message was received.

20. A method as recited in claim 18,

wherein the message is an e-mail message, and
wherein said method further comprises adding information to the grammar from an address book entry for the sender of the e-mail.

21. A method as recited in claim 1, further comprising automatically updating the grammar based on calendar information stored for a user asking the spoken question.

22. A method as recited in claim 21, wherein said updating includes adding to the grammar to enable said recognizing for questions about locations found in the calendar information.

23. A computer readable medium storing at least one program for controlling an interactive voice response system to perform a method comprising:

recognizing a spoken question using a grammar that is automatically updated from sources of information external to the interactive voice response system.

24. A computer readable medium as recited in claim 23, wherein said method further comprises automatically obtaining at least one set of topics for questions spoken by a user from the sources of information.

25. A computer readable medium as recited in claim 24, wherein said obtaining uses at least one communication connection between the interactive voice response system and at least one news report provider to obtain news reports.

26. A computer readable medium as recited in claim 25, wherein said obtaining includes repeatedly accessing the at least one news report provider via a computer network.

27. A computer readable medium as recited in claim 26, wherein said method further comprises:

- extracting keywords from the news reports; and
- updating the grammar using the keywords.

28. A computer readable medium as recited in claim 27, wherein said method further comprises:

- storing at least part of the news reports; and
- outputting at least one of the news reports when the spoken question contains at least one of the keywords extracted therefrom.

29. A computer readable medium as recited in claim 25, wherein said method further comprises determining the at least one news report provider based on selection by the user.

30. A computer readable medium as recited in claim 29, wherein said determining is performed by

- outputting an audio signal containing a list of available news report providers; and
- receiving selection of the at least one news report providers by the user.

31. A computer readable medium as recited in claim 23, wherein said method further comprises automatically obtaining grammar words to be added to the grammar from at least one message for a user.

32. A computer readable medium as recited in claim 31, wherein said method further comprises:

comparing message words in the at least one message with information in a global information database to determine for each message word whether there are any corresponding questions that can be answered by information in the global information database; and

updating the grammar with the corresponding questions and related message words.

33. A computer readable medium as recited in claim 31, wherein said method further comprises:

comparing message words in the at least one message with information in a synonym database to determine synonyms for the message words; and

adding the synonyms to the grammar.

34. A computer readable medium as recited in claim 31, wherein said method further comprises automatically adding words to the grammar based on a source of the message.

35. A computer readable medium as recited in claim 34, wherein the message is a voicemail message and the source of the message is determined based on automatic number identification provided when the voicemail message was received.

36. A computer readable medium as recited in claim 34,
wherein the message is an e-mail message, and
wherein said method further comprises adding information to the grammar from an address book entry for the sender of the e-mail.

37. A computer readable medium as recited in claim 31, further comprising automatically updating the grammar based on calendar information stored for a user asking the spoken question.

38. A computer readable medium as recited in claim 37, wherein said updating includes adding to the grammar to enable said recognizing of questions about locations found in the calendar information.

39. An interactive voice response system, comprising:
recognition means for recognizing a spoken question using a grammar;
and
update means for automatically updating the grammar from sources of information external to said interactive voice response system.

40. An interactive voice response system as recited in claim 39, further comprising means for communicating between the interactive voice response system and at least one news report provider to obtain news reports.

41. An interactive voice response system as recited in claim 40,
further comprising extraction means for extracting keywords from the news reports; and
wherein said update means automatically updates the grammar using the keywords.

42. An interactive voice response system as recited in claim 41, further comprising:
means for storing at least part of the news reports; and
means for outputting at least one of the news reports when the spoken question contains at least one of the keywords extracted therefrom.

43. An interactive voice response system as recited in claim 39, wherein said update means includes means for automatically obtaining grammar words to be added to the grammar from at least one message for a user.

44. An interactive voice response system as recited in claim 43,
wherein said update means further includes
means for comparing message words in the at least one message with information in a global information database to determine for each message word whether there are any corresponding questions that can be answered by information in the global information database; and

means for automatically updating the grammar with the corresponding questions and related message words.

45. An interactive voice response system as recited in claim 39, wherein said update means automatically updates the grammar based on calendar information stored for a user asking the spoken question.

46. An interactive voice response system as recited in claim 45, wherein said update means adds to the grammar to enable said recognition means to recognize questions about locations found in the calendar information.

47. An information services system, comprising:

at least one storage unit to store a grammar and information for response to a question by a user;

at least one processor, coupled to said storage unit, programmed to automatically update the grammar and the information from sources of information external to the information services system, and to recognize a question spoken by the user.

48. An information services system as recited in claim 47, further comprising:

a master control unit to control operation of said information services system, and

a plurality of application processing units, coupled to said master control unit, each including

at least one processor unit providing said processor,

one of said at least one storage unit, coupled to said at least one processor unit, and

at least one telephone interface unit coupled to said at least one processor unit.